

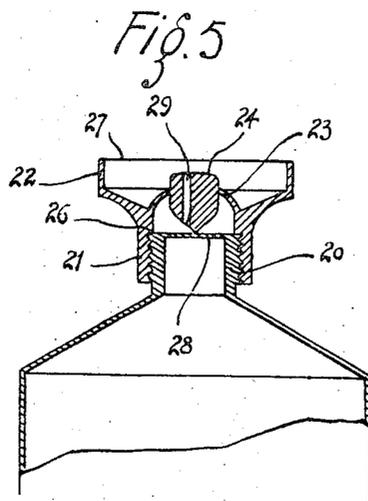
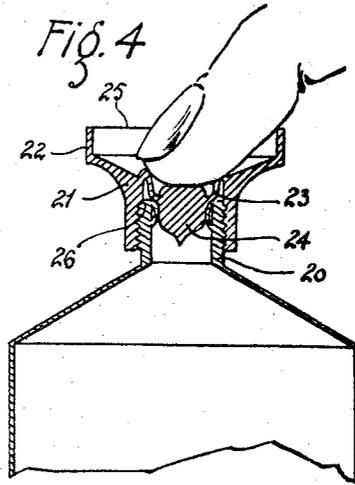
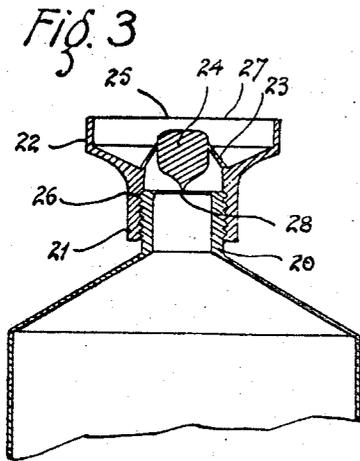
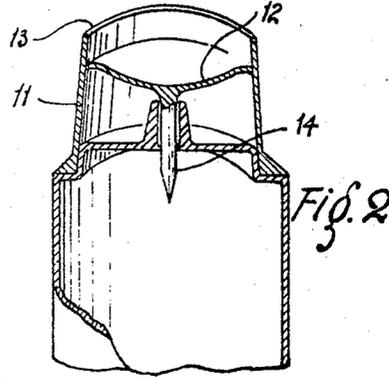
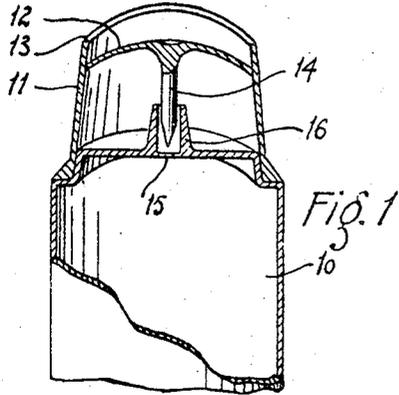
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PERFORATOR CAP

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PERFORATOR CAP

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ABSTRACT OF THE DISCLOSURE

A perforator cap for tubes, bottles and other receptacles, in which the perforator element is fixed to a deformable flexible membrane inserted in a bowl and set back with respect to the outer edge of said bowl. The perforator element has substantially the same outer diameter as the inside diameter of the orifice of the receptacle, thereby also to serve as a stopper for the receptacle.

In order to ensure complete protection of products between their packing and their consumption, it is usual practice to enclose them in tubes or flasks provided with a capsule or cap which the consumer must perforate at the moment of use.

This perforation is effected by means of a needle or any other pointed object, scissors, nails, etc. The perforator may be included in the packing or may be carried by the cap.

In accordance with one of these arrangements, the perforator is rigidly fixed in a cap which is not fully screwed down because of a small interposed washer. In order to utilize the product, the consumer has to unscrew the cap, remove the spacing washer and then screw-down the cap fully so as to cause the perforator to pass through the sealing diaphragm which is punctured.

This solution thus makes it necessary, on the one hand for the manufacturer to add a washer to the usual screw cap, and on the other hand the consumer is obliged to carry out a number of manipulations. These are considerable complications.

In order to obtain a simpler opening operation for the tube or flask, it has been proposed to provide the latter with a cap, the bottom of which is elastic and comprises a perforator needle. By pressing on the elastic bottom, the needle is forced inwards and the sealing diaphragm is perforated.

The present invention has for its object a perforator cap of this type which has been improved.

According to the invention, the perforator cap is characterized in that the membrane carrying the perforator needle is thin and deformable and is set-back with respect to the upper edge of the cap; it has a curvature which ensures its maintenance in convex or concave positions, without spontaneous change-over from one to the other.

With this arrangement, the membrane having an initially convex form, holds the perforator needle in a waiting position. When the membrane is pushed down, it takes a concave shape and pushes the needle which effects the perforation of the sealing diaphragm. The membrane remains in this concave position, holding the needle in its depressed position so that it serves to close the perforated diaphragm.

With a cap constructed in this way, the perforator needle is protected against any accidental operation; in its set-back position in the cap, it is protected against any clumsy shocks or handling. Only a deliberate operation can put it into operation by causing the perforation and opening of the tube or flask. Similarly, in the perfo-

rated position, the needle remains in a position such that it plays the part of a permanent closure member.

Forms of embodiment of the invention are illustrated in the accompanying drawings, in which:

FIG. 1 is a view of the perforator cap mounted in its initial position on a flask;

FIG. 2 shows the cap in the perforation or closure position;

FIGS. 3 and 4 are views in cross-section of an alternative form of construction of the perforator cap, shown respectively in its initial position and in the perforated position;

FIG. 5 shows a cross-section of a further alternative form of construction.

In FIG. 1, the cap covering the flask or bottle 10 comprises a cylindrical or frusto-conical body 11, and its extremity is formed by a thin deformable wall 12 acting as a flexible membrane. This membrane 12 is set back with respect to the upper edge 13 of the cap. It is provided at its centre with a needle or pointed pin 14.

The bottle 10 filled with the product, is closed and a closure diaphragm is provided at 15, if necessary with a guide-conduit 16.

The bottle 10, fitted, is originally delivered with the cap in which the membrane is in the position shown in FIG. 1, that is to say forming a convex extremity.

In order to open the bottle 10, the centre of the membrane 12 is depressed, which brings the latter into the concave position shown in FIG. 2. By this action, the needle 14 pierces the diaphragm 15 and the product can be extracted from the bottle 10 as soon as the cap 11 is removed.

After use, the cap is replaced in position. The depressed needle serves to close the hole pierced in the diaphragm 15.

In the alternative form shown in FIGS. 3 and 4, the cap, screwed on the threaded end 20 of a tube or bottle, is constituted by a body 21 flared to form a bowl 22, and it is the bottom 23 of this bowl which forms the thin deformable wall. This carries the perforator punch 24, the head 25 of which forms an operating knob. The body 21 is arranged so as to constitute an abutment 26 which comes into contact with the extremity of the end-piece 20. The wall 23 is set back with respect to the edge 27 of the bowl 22.

The tube being filled with product, the end 20 is closed at the outset by a diaphragm 28 and is covered by the screwed cap 21-22, shown in FIG. 3. In order to open the tube by piercing the diaphragm, the head 25 is depressed, which deforms the membrane 23, and this passes from the convex position to the concave position shown in FIG. 4, carrying with it the punch 24 which pierces the diaphragm 28. The thin wall 23 remains in this depressed position, the punch 24 serving to close the tube.

In the alternative form shown in FIG. 5, the punch 24 may be provided with a conduit 29 permitting the distribution of the product after the punch 24 has been depressed.

The cap may of course be of the type with a screw, with a smooth fit, with notches, or may be held on its base in any desired manner. The perforator may be moulded in a single piece with the cap or it may be fixed on the deformable membrane; it may be of plastic, metallic or other material. The flexible or deformable membrane may have a dome-shaped surface, as shown in the accompanying drawings, or it may be of bellows shape or it may have any other desired form.

What we claim is:

1. In combination with a receptacle having an orifice closed by a penetrable closure, a cap for penetrating the closure and closing the orifice, the cap comprising a body mounted on the orifice of the receptacle, the body having

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an upper edge and a thin deformable diaphragm disposed in the body in recessed relation to the upper edge of the body, the diaphragm having a curvature ensuring, in a concave or convex position, its non-reversible maintenance without spontaneously passing from one position to the other, and a perforator member carried by the diaphragm, said perforator member having a cross-sectional configuration substantially the same as the cross-sectional configuration of the orifice of the receptacle and ensuring fluid-tightness of the receptacle by jamming into said orifice.

2. A structure as claimed in claim 1, in which the perforator member comprises a head forming a finger piece.

3. A structure as claimed in claim 2, said perforator member having a longitudinal passageway therethrough.

4. A structure as claimed in claim 2, the top of said head being disposed below said upper edge of the body.

5. A structure as claimed in claim 1, said perforator member having an upper position in which said dia-

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phragm is downwardly concave and the side walls of the perforator member below the diaphragm are substantially upright.

6. A structure as claimed in claim 1, said diaphragm and penetrator member being integral.

7. A structure as claimed in claim 1, said orifice being defined by side walls of the receptacle that are substantially perpendicular to said penetrable closure.

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